SYSTEM AND METHOD FOR IDENTIFYING THE GEOGRAPHIC REGION OF A GEOGRAPHIC AREA WHICH CONTAINS A GEOGRAPHIC ZONE ASSOCIATED WITH A LOCATION

FIELD OF THE INVENTION

This invention relates in general to the field of geographic coding and in particular to a system and method for identifying the geographic region of a geographic area which contains a geographic zone associated with a location.

BACKGROUND OF THE INVENTION

A number of wireless devices have been developed to meet the needs of an increasingly mobile society. Devices such as telephones which were once hard-wired to a single location are now portable. Traditionally, when a customer requested telephone service, the customer was assigned a telephone number that was operable from a fixed location such as the customer's home or office. However, when a wireless customer requests service, the wireless customer is assigned a number which is operable over a large geographic area.

Wireless service is available virtually throughout the United States. The geographic area of the United States has been divided into geographic regions commonly referred to as Basic Trading Areas ("BTA's") by Rand McNally & Company. The Federal Communications Commission ("FCC") uses BTA's to define wireless coverage areas throughout the United States. The FCC issues a license for each BTA to permit a wireless service provider to operate within a specified frequency block within the BTA. A license permits a single service provider to operate within the BTA's frequency block and to serve wireless customers with billing addresses within the BTA. A single service provider may hold multiple licenses and may operate in multiple BTA's.

The wireless service provider for a particular BTA determines the calling features or services offered to customers within the BTA. Different service providers may offer different services and even the same service provider may offer different services in different BTA's. Not only may the services differ from BTA to BTA, but the tax rate for wireless service may differ from BTA to BTA.

To apply the proper tax rate to the customer's bill, the BTA which contains the customer's address must be identified. The BTA could be identified manually by a customer service representative or by a computer program using some type of lookup table or map. However, in either case there is room for error. If the address supplied by the customer is in error or is incorrectly recorded by the customer service representative, the correct BTA will not be identified. In addition to the possibility of human error, if the address is in a new development and is not yet included in the table or map, a BTA will not be identified. Thus, there is a need for a reliable method for identifying the BTA which contains a customer's address.

Once the correct BTA is identified, a BTA identifier may be included in the customer's file. The service provider may use the BTA identifiers to determine customers with billing addresses located in a selected BTA. If a service provider intends to offer additional calling features to customers in a selected BTA, those customers in the BTA can be targeted to receive information regarding the additional features.

In addition to relating a customer's billing address to a BTA, relating a customer's operating location to a BTA or other geographic region is also useful. When a customer reports a problem it is helpful to identify the BTA in which the customer was located when the problem occurred. If a customer reported that a calling feature was inoperable, it would be helpful to know whether the customer was in a BTA where the feature was offered when the problem occurred. It is also useful to relate a customer's operating location to a geographic region defined by the operating range of an antenna or other piece of equipment. By monitoring the locations of customer problems, a service provider may become aware of developing trends and may be able to take preventive action. For example, the occurrence of a number of problems in close proximity to an antenna or other piece of equipment may indicate an equipment problem.

To relate a customer's billing address or operating location to a BTA or other geographic region, the operating location and the geographic region may be geographically encoded or geocoded. To geocode an address or operating location, the address or description of the operating location is converted into longitude and latitude. A geocoder is a program module which converts a location description into longitude and latitude. An example of a geocoder is P.A.C.E. (Probabalistic Address Coding Engine) from Matchware Technologies, Inc., 15212 Dino Drive, Burtonsville, Md. 20866.

Longitude and latitude for a location may be obtained for a street address using a geocoder such as P.A.C.E. However, there may be times when a street address is unavailable. For example, at activation, a customer may provide a street address which cannot be resolved into longitude and latitude because the address is in a new development. In this case, the customer's location may be estimated by the geographic zone defined by the customer's zip code. Since it is preferable to store longitude and latitude for a single point, the longitude and latitude for the centroid of the customer's zip code zone may be stored. Another example is where a customer reports a problem but cannot identify a street address where the problem occurred. If the customer could identify a neighborhood, the longitude and latitude for the centroid of the neighborhood zone could be used.

To geocode a region, the region boundary points of the region are converted into a plurality of longitudinal and latitudinal coordinates. Similarly, to geocode a zone boundary points of the zone are converted into a plurality longitudinal and latitudinal coordinates. Libraries of geocoded data are available which contain longitude and latitude for geographic regions such as BTA's and for geographic zones such as zip code zones. Examples of geocoded data libraries include Dynamap/2000 Street Network File from Geographic Data Technologies, 11 Lafayette Street, Labanon, N.H. 03766 and BTA/MTA Boundaries U.S. from MapInfo Corp., One Global View, Troy, N.Y. 12180. Once a location and a region are described by longitude and latitude, a comparison may be made between the longitude and latitude for the location, and the longitude and latitude for the region to determine whether the location is located within the geographic region.

If the identification of the geographic region which contains the location is made in real time, the identification is more useful. In the account activation example, if the location information provided by the customer is resolved into longitude and latitude for a zip code zone within the geographic area, but the longitude and latitude do not identify a BTA served by the wireless service provider, then there is probably an error in the zip code. If the identification of the BTA which contains the location can be made while